

**REMARKS**

This is in response to the Office Action issued on July 31, 2002. By this response, claims 1-22 are pending. The Abstract is amended to correct informality. No new matter is introduced.

The Office Action rejected claims 1-5, 9, 10, 18 and 19 under 35 U.S.C. §103(a) as being unpatentable over Sievers et al. (U.S. Patent No. 4,379,990) in view of Hulls et al. (U.S. Patent No. 4,178,546), claims 6-8, 16, 17, and 20-22 under 35 U.S.C. §103(a) as being unpatentable over Sievers et al. in view of Hulls et al. and Pierret et al. (U.S. Patent No. 5,233,285), and claims 11-15 under 35 U.S.C. §103(a) as being unpatentable over Sievers et al. in view of Hulls et al. and Bertness (U.S. Patent No. 6,331,762). The Office Action also objected to Abstract for formality reasons. The rejections and objection are respectfully traversed in light of the remarks presented herein.

**REJECTIONS OF CLAIMS UNDER 35 U.S.C. § 103 ARE TRAVERSED**

Claims 1-5, 9, 10, 18 and 19 were rejected as being unpatentable over Sievers in view of Hulls. The rejection is respectfully traversed because the references do not support a *prima facie* case of obviousness.

A *prima facie* case of obviousness under 35 U.S.C. § 103 requires three criteria be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation in the references themselves to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success for the modification or combination of references. Further, the teaching or suggestion to make the modification or combination

of prior art and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The teachings, motivations or suggestions to combine references must be based on objective evidence of record and cannot be resolved on subjective belief and unknown authority. *In re Lee*, Federal Circuit Case No. 00-1158 (January 18, 2002). Additionally, there must be particular finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge to the claimed invention to combine or modify references. *In re Kotzab*, 217 F.3d 1365, 55 U.S.P.Q.2d 1313 (Fed. Cir. 2000). The references, however, do not meet these requirements.

Independent claim 1 recites:

*A method for evaluating operation of an alternator comprising:*  
*detecting a frequency component of an alternator output signal;*  
*comparing the frequency component of the alternator output signal with a threshold frequency;*  
*and*  
*evaluating operation of the alternator based on a result of the comparing step.*

Independent claims 4 and 18 include limitations comparable to those of claim 1.

Sievers is related to a fault detection system of an alternator. Sievers describes using a plurality of status detectors to detect numerous parameters. The detected parameters are compared with threshold values such that faults in the alternator can be identified (Fig. 2; col. 12, ln. 65-col. 13, ln. 5; col. 14, ln. 57-col. 16, ln. 21).

In rejecting the claims, the Office Action asserted that Sievers provides a ripple detector 88 to detect ripple signals, and compares the detected result with a threshold

value. The Office Action correctly recognized that Sievers does not teach detecting a frequency component as required by the claims. However, the Office Action erred by relying on Hulls to alleviate the deficiencies.

Hulls is directed to an alternator tester for testing failed diodes by detecting the alternator output ripple (Abstract; Figs. 2 and 3). The Examiner contended that Hulls and Sievers, combined, disclose every limitation of the claims because Sievers compares alternator output with a threshold value and Hulls uses frequency to determine the health of an alternator. Applicants respectfully disagree.

According to Sievers, the ripple detector 88 is used to determine the **ripple voltage level**, not the **ripple frequency**. The threshold value is a **threshold voltage**, not a **threshold frequency**. (col. 15, lns. 8-20; col. 16; lns. 8-17). Thus, Sievers does not disclose "comparing the frequency component of the alternator output signal with a threshold frequency; and evaluating operation of the alternator based on a result of the comparing step," as required by the claims.

Hulls, however, does not alleviate these deficiencies. According to Hulls: "If one of the diodes becomes open circuited, a negative voltage dip is produced in the alternator ripple voltage as shown at 26 in Fig. 3. Assuming that the normal ripple voltage...is  $f$ , as shown in Fig. 2, then the failed diode **voltage dip 26** occurs at a subharmonic frequency  $f/6$ ." (col. 2, lns. 1-8) Thus, rather than determining the alternator status based on changes of ripple frequencies as required by the claims, what Hulls discloses is detecting the appearance of a voltage dip at a specific subharmonic of  $f$  (col. 2, lns. 14-21). This is also evident from claim 1 of Hulls, which states "tracking the frequency of

and measuring the **amplitude** of a particular subharmonic of said variable frequency  $f$ , said **amplitude**, when it exceeds a **given value**, being indicative of a failed diode (col. 4, lns. 3-6)," or from the specification, which states that "the presence of a faulty diode...is detected by measuring the amplitude of a subharmonic of the ripple component (col. 1, lns. 36-39)." In order to achieved these ends, Hulls uses a filter with a specific passing band, such as  $f/6$  or  $f/x$ , to detect the appearance of the voltage dip (Fig. 4). Therefore, Hulls, at most, describes detecting the appearance of a specific frequency component in the ripple and comparing the magnitude thereof with a given value.

Accordingly, both Hulls and Sievers compare ripple voltages with a threshold voltage, not a threshold frequency. Even if Hulls and Sievers (comparing alternator output with a threshold value) are combined, the combination, at most, teaches comparing the magnitude of a specific frequency with a threshold value," not "comparing the frequency component of the alternator output signal with a threshold frequency; and evaluating operation of the alternator based on a result of the comparing step," as required by claims 1, 4 and 18.

Since the references, even combined, fail to disclose every limitation of the claims, the references cannot support a prima facie case of obviousness. Thus, the obviousness rejection is untenable and should be withdrawn. Claims 2, 3, 5, 9, 10 and 19 depend on claims 1, 4 and 18 respectively and incorporate every limitation described therein. Therefore, the obviousness rejection of the claims are also untenable and should be withdrawn based on at least the same reasons discussed in claims 1, 4 and 18, as well as on their own merits. Favorable consideration of the claims is respectfully requested.

Claims 6-8, 16, 17, and 20-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sievers in view of Hulls and Pierret. The rejection is traversed because the cited references do not support a prima facie case of obviousness.

Independent claim 16 recites:

*A system for evaluating the operation of an alternator comprising:*

*...  
an adaptive threshold device for generating a reference threshold based on the level of the alternator output signal according to a predetermined rule;*

*a comparator for...generating a frequency signal indicating the frequency component of the alternator output signal based on the comparison result;*

*a controller for comparing the frequency component of the alternator output signal with a threshold frequency, and generating an indication signal representative of the operation of the alternator based on the comparison result of the frequency component and the threshold frequency...*

In rejecting claim 16, the examiner asserted that, in addition to the arguments used in rejecting claim 1, Pierret, in Fig. 5, discloses generating a reference threshold based on the level of the alternator output signal according to a predetermined rule. Applicants respectfully disagree. Pierret, in fact, is related to using feedback to adjust the level of a signal to track a fixed reference voltage  $V_{ref}$ . When the signal crosses  $V_{ref}$  in the positive direction, a negative feedback is provided. On the other hand, when the signal crosses  $V_{ref}$  in the negative direction, a positive feedback is provided (col. 3, lns. 14-26). Therefore, the threshold voltage  $V_{ref}$  used in Pierret is a fixed voltage. Pierret does not teach "an adaptive threshold device for generating a reference threshold based on the level of the alternator output signal according to a predetermined rule," as required by claim 16.

Since the cited references fail to disclose every limitation of the claims, the cited reference cannot support a prima facie case of obviousness. Claim 16 is thus patentable over the cited references. Claim 17 depends on claim 16 and include every limitation thereof. Thus, claim 17 is also patentable.

Claims 6-8 and 20-22 include limitations comparable to those of claim 16. Therefore, the claims are also patentable based on the same reasons discussed in claim 16 as well as on their own merits.

Claims 11-15 were rejected as being unpatentable over Sievers in view of Hulls and Bertness. Claims 11-15 depend on claim 4, directly or indirectly, and include every limitation thereof. As discussed earlier, Sievers and Hulls, even combined, fail to disclose every limitation of claim 4. Bertness is relied upon by the Examiner as disclosing the use of database to provide threshold values. Bertness does not alleviate the deficiencies of Sievers and Hulls. Accordingly, the references, even combined, do not teach every limitation of the claims. The obviousness rejection is thus untenable and should be withdrawn. Favorable consideration of the claims is respectfully requested.

#### **THE OBJECTION OF THE ABSTRACT IS ADDRESSED**

The Abstract was objected to for formality reasons. Specifically, the Examiner indicated that the Abstract contains the term "comprises," which is an improper phrase to be used in the Abstract. By this response, the abstract is amended to remove the objected term, and is now in proper form.

**CONCLUSION**

Therefore, the present application claims subject matter patentable over the references of record and is in condition for allowance. Favorable consideration is respectfully requested. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Recognition Under 37 C.F.R. §10.9(b)

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**VERSION WITH MARKINGS SHOWING CHANGES MADE****IN THE ABSTRACT**

Please amend the abstract as follows:

A method and system for evaluating the operation of an alternator based on a frequency component in the alternator output signal. The method [comprises detecting] detects a frequency component of the alternator output signal, [comparing] and compares the frequency component of the alternator output signal with a threshold frequency. [,] [and evaluating the] The operation of the alternator is evaluated based on a result of the comparison. If the frequency component of the alternator output signal is lower than the threshold frequency, the alternator is determined as defective. The frequency component can be obtained by comparing the alternator output signal with an adaptive threshold. The adaptive threshold is generated based on the peak signal level and the valley signal level of the alternator output signal, such as the average of the peak signal level and valley signal level.